ENTERPRISE PARKER TRUSS BRIDGE
Enterprise
Dickinson County
Kansas

HAER No. KS-5

HAER
KANS,
21-ENPR1,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HAER
KANS.
21-ENPRI,
1-

HISTORIC AMERICAN ENGINEERING RECORD
ENTERPRISE PARKER TRUSS BRIDGE

I. INTRODUCTION

Location:	Spanning the Smoky Hill River on K-43 Highway, Enterprise, Kansas
Quad:	Enterprise, Kansas
UTM:	14/663020/4309900
Date of Construction:	1924-25
Present Owners:	State of Kansas Department of Transportation Topeka, Kansas
Present Use:	Vehicular and pedestrian bridge to be replaced by a new vehicular and pedestrian bridge. Projected date of removal, Spring of 1987
Significance:	The Enterprise is a single span, steel and concrete, high through parker truss and is one of only twenty-nine remaining examples in the state. As a rivited truss, the Enterprise bridge represents a good example of late metal truss construction.
Historian:	Larry Jochims, Kansas State Historical Society

ENTERPRISE PARKER TRUSS

The bridge over the Smoky Hill River at Enterprise, the subject of this report, is a single span Parker High Steel Truss Bridge 160 feet long with a 28 foot long approach span on its north end. Its reinforced concrete decking is 15 feet wide and rests 33 feet above the low water level. The bridge has approximately 15 feet of vertical clearance and is of riveted steel construction.

Bids were let for the Enterprise high steel Parker truss bridge on November 24, 1924. The proposed erection of the steel structure had sparked a certain amount of public debate. This was the time when concrete structures were becoming more popular throughout the state. Concrete bridges were considered more beautiful than steel and much more permanent. These two factors alone offset the higher initial costs, in many minds. The Junction City Union [November 14, 1924, p. 6] recounted an article from the Abilene Reflector which stated that Dickinson was about the only county in the state erecting "tin" bridges on its main roads and "the small difference in cost between these and concrete structure that are ornamenting main highways in other counties makes the action more noticeable." It praised the "beautiful and permanent" Chapman Rainbow Arch and predicted it would be there when the new "tin" bridge was condemned and rebuilt. (This prediction turned out to be somewhat optimistic as the Chapman bridge was removed in 1982.) The Reflector advised Dickinson county to forget the "Pennywise and pound foolish" policies and build for the future. It predicted the bridge would mark the short-sightedness of its generation in the next 50 years. In a similar vein the Reflector had announced on the 13th that Enterprise deserved a "real bridge" as an entrance to the City.

In spite of the protests the bids were opened November 25, 1924. The contract was awarded by the county commission to Yancey Construction Company of Abilene for the sum of $35,864.38. On the advice of A. A. Clausen, Assistant Bridge Engineer of the U. S. Highway Bureau, and R. F. Gallop, State Highway Engineer, the structure would be of "reinforced concrete construction with steel overhead truss." It would also provide a sidewalk on the west side and arrangements for carrying the water main across the river.

Controversy again erupted when the county commissioners expressed opposition to providing a temporary bridge for use during construction. Not only would this interrupt the trade into the city but would also seriously interrupt the delivery of mail from the Union Pacific from Detroit. The city received the larger percentage of its mail from the Union Pacific and the carrier made three trips a day during the week. Any alternate route would require eight extra miles in good weather and be almost impossible in inclement weather. On December 11, 1924, The Enterprise Journal prayed that "May the Lord so provide that it will not be necessary to again ask for any accommodations from the present board." The board did go so far as to install a cable foot bridge capable of holding five persons but locals questioned its safety.

Work progressed smoothly on the new bridge. Excavation for the south pier was completed and concrete forms were up by April 2, 1925. The excavation reached a depth of 40 feet, which was 22 feet below the water level of the river. Dirt was removed from the 21 x 22 feet pit by the use of large steel barrels and a hoist. The north pier was dug in a similar manner to a depth of 26 feet below the water level of the river. It was a little less difficult, however, as it was only 11 x 32 feet. On April 27, the workmen struck the base of the old piers which were placed in the 1870s. It consisted

of 12" square black walnut timbers, to which were pegged 8 foot black walnut 4 x 12" planks.

The steel placement was begun in June. By June 25, all of the base work was in place and the overhead work was in progress. The structure was bolted in position and the bolts later supplemented by rivets.

The first major threat to the bridge came Saturday, June 27. Heavy rains caused a six foot high, half mile long bank to bank wedge of driftwood to break through retaining cables at Abilene and begin to move towards Enterprise. The Marsh Company, building the Buckeye bridge in Abilene, had agreed to try and hold the material. Rising water caused their restraining cables to break at 3:00 a.m. Fortunately much of the debris scattered before reaching Enterprise and a large force of men was successful in diverting the pieces from the bridge supports and corraling the remainder above the bridge by the use of cables. By 3:00 p.m. the immediate crisis had passed. Work quickly resumed on the bridge and by working Sunday, it was made self supporting.

The remainder of the construction proceeded relatively smoothly and the August 6, 1925 issue of the Reflector quoted construction superintendent Reedy to the effect that the bridge would be opened by August 8. However, someone stole the magneto from the gasoline engine which was essential to the riveting and caused a two day delay. The steel work was completed August 3 and the final fill work was commenced on the 4th. Although a large crew of men and teams made short work on the approach fill the earth was left to settle for several weeks before the cement work connecting the pavement was finished.

Sam Yancey, president of Yancey Construction, revealed that there were 260,028 pounds of steel in the bridge. It was designed to carry large motor and truck loads and was of unusually heavy construction. The bridge would

serve both the agricultural and manufacturing interests in Enterprise. With a main span of 160 feet the bridge was one of the longest of its type in Kansas at the time.

Although the idea of a steel bridge had not met with universal acceptance initially, most critics had changed their minds by the time it was completed. The Enterprise Journal declared that it was "Truly a fine bridge and one that will stand for generations to come."

The bridge was dedicated on September 17, 1925 in conjunction with the two day long "Old Settlers Day and Fall Festival." The Journal predicted that it would ". . . bring back many memories of the building of the old and the fording of the river before it was built." Approximately 1,000 people attended the Thursday bridge dedication and reunion events.

By the 1920s the nationwide system of roads was in its infancy but growing. The Federal Highway Act of 1921 had imposed national standards on highway design and construction. This gave further impetus to the trend towards standardization begun around 1900. With the mass production of standard shapes, posts, channels, angles, rods, T's, and beams, companies found it much simpler to stock these "standard shapes" than order specially made members. When it received a bridge order, a company computed the stresses, determined the dimensions of the various shapes needed and then cut the stock to length. The chords and posts were fabricated from channels, plates, angles, and straps.

The greater tensile strength of steel allowed the use of fewer though more massive members than the older wrought iron did. Steel bridges, such as the Enterprise Parker Truss, make a definite first impression on the viewer. As David Weitzman reports in his Traces of the Past, the steel bridge appears "more massive, ponderous, more earthbound," than its wrought iron relative.

The riveted members of the Enterprise bridge are indicative of a change in construction techniques during the first two decades of the 20th century.

American engineers of the 19th century preferred pin connected designs. There were several reasons for this. Pin connected bridges were faster to assemble than the early riveted ones. This resulted in a cost savings as well as a positive safety factor. Workers were subjected to the hazards of their job for a shorter amount of time. The quality of the early riveted structures was sometimes questioned since it was not possible to be certain of a rivet's integrity once it had been installed. Each was subjected to a great deal of stress and sometimes was quite brittle after cooling. The stresses in a riveted joint were much more difficult to determine than in a pinned joint. Engineers saw the pin as one large rivet and knew its tensile strength and qualities. lt was basically more predictable. On the other hand pinned connections were less rigid than riveted systems and required more web members, counters, vibration rods and struts for stability under various loading conditions.

The invention of the pneumatic hammer in 1892 and the subsequent development of the pneumatic riveter changed engineers' attitudes. Riveting could now be done in the field faster than before. The connection which resulted was also stronger and more reliable. By the time the Enterprise bridge was built, riveted construction had gained the ascendancy.

Twenty-nine extant Parker high steel truss bridges have been identified in the state. Since they comprise only 9% of the historic high steel trusses presently in existence, they are relatively rare. As a riveted truss, the Enterprise Parker truss bridge represents a good example of late metal truss construction.

BIBLIOGRAPHY

"Let Bridge Contract," The Enterprise Journal, November 27, 1924, p. 1, c. 4.

"Do Not Favor Temporary Bridge," The Enterprise Journal, December 11, 1924, p. 1, c. 3.

"Bridge No Playground," The Enterprise Journal, February 26, 1925, p. 1, c. 4.

"Work Progressing Nicely," The Enterprise Journal, April 2, 1925, p. 1, c. 3.

"Walnut Planks are Excavated," The Enterprise Journal, April 30, 1925, p. 1, c. 5.

"Work Progressing Nicely on Bridge," The Enterprise Journal, June 25, 1925, p. 1, c. 3.

"All Danger Now Past," The Enterprise Journal, July 2, 1925, p. 1. c. 1.

"Bridge May Be Opened by August 8," The Enterprise Journal, July 30, 1925, p. 1, c. 3.

"Traffic Over Bridge by Saturday," The Enterprise Journal, August 6, 1925, p. 1, c. 5.

"Driftwood Still Remains," The Enterprise Journal, August 6, 1925, p. 1, c. 3.

"Plan For Celebration," The Enterprise Journal, August 13, 1925, p. 1, c. 3.

"Enterprise Big Days Draw Near," The Enterprise Journal, September 10, 1925, p. 1, c. 4.

"Celebration A Record Breaker," The Enterprise Journal, September 24, 1925, p. 1, c. 4.

"Enterprise Only to Have Tin Bridge?" Abilene Weekly Reflector, November 13, 1924, p. 3, c. 2.

"Tin Bridges," Abilene Weekly Reflector, November 13, 1924, p. 3, c. 3.

"Tin Bridges the Fad," Junction City Daily Union, November 14, 1924, p. 6, c. 4.

"Tin Bridge Idea Wrong," Abilene Weekly Reflector, November 27, 1924, p. 4, c. 4.

"It's Nearing Completion," Abilene Weekly Reflector, August 6, 1925, p. 2, c. 8.

"Quarter Million Lbs. of Steel in Bridge Built at Enterprise," Abilene Weekly Reflector, August 20, 1925, p. 2, c. 1.

Plans and Files, Design Department, Kansas Department of Transportation, Topeka, Kansas, Microfilm Roll #137, Frames 266-289.

Weitzman, David, Traces of the Past: A Field Guide to Industrial Archeology, New York; Charles Scribner's Sons, 1980.